

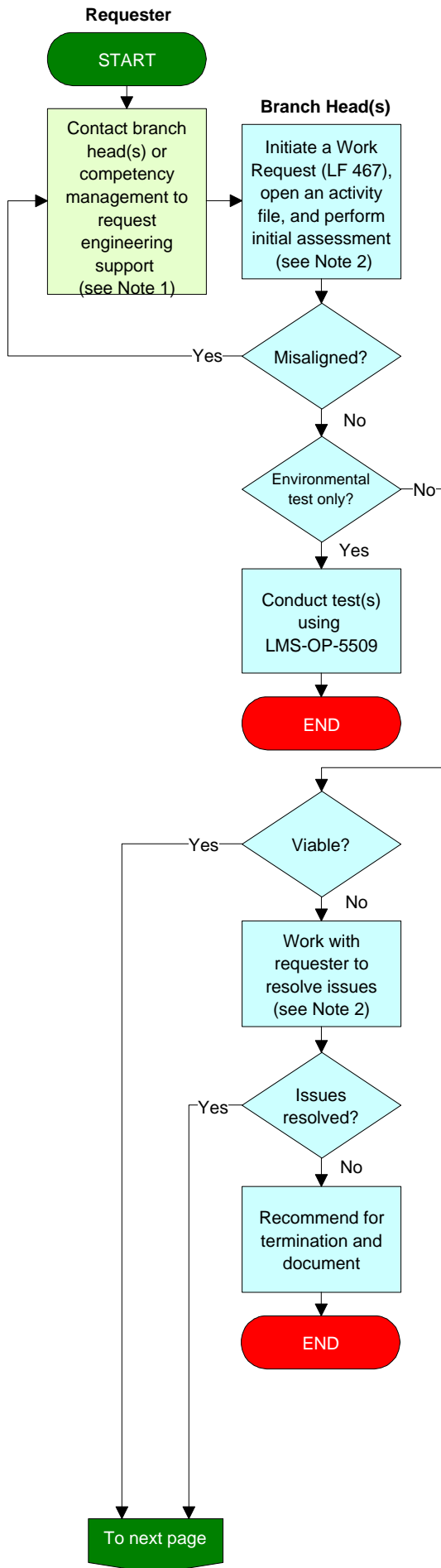
SYSTEMS ENGINEERING REQUIREMENTS DEFINITION & IMPLEMENTATION PLANNING FOR RESEARCH PROJECTS/EXPERIMENTS

LMS-CP-5502
Revision: C-3

Objectives:

- to provide a single point entry into the systems engineering (design and development) process
- to assure requirements are well defined and resource estimates are reliable
- to define and prepare preliminary Requirements and Development Plan(s)
- to assure management review of new projects and activities
- to identify and mitigate risk before proceeding to full development

Approval _____ Original signed on file
Associate Director for Research and Technology Competencies



General Information

The following records are generated by this procedure and should be maintained in accordance with CID 1440.7:

Work Request (LF 467)
Requirements, Performance Specifications
Development Plan
Configuration Management Plan
Product Assurance Plan

Note 1

Self-initiated requests must be sponsored by a LaRC Program Office.

Requests can be verbal, written, or e-mail. Upon receipt of a verbal request the Branch Head must document the request.

Contact competency Branch Heads based on type and scope of activity requested. The Branch Head must have functional responsibility and authority to commit resources to the project/activity.

It is the responsibility of contacted managers to notify a competency manager who will open an activity file and contact other affected Branch Head(s) at the time of notification.

Note 2

If misaligned, the contacted manager must redirect the requester to the appropriate branch or competency office.

If issues are associated with resource shortages, work with competency and program management and the requester to address issues.

It is the responsibility of all affected Branch Heads to initiate a Work Request (LF 467), open an activity file, and participate in an assessment in their functional areas.

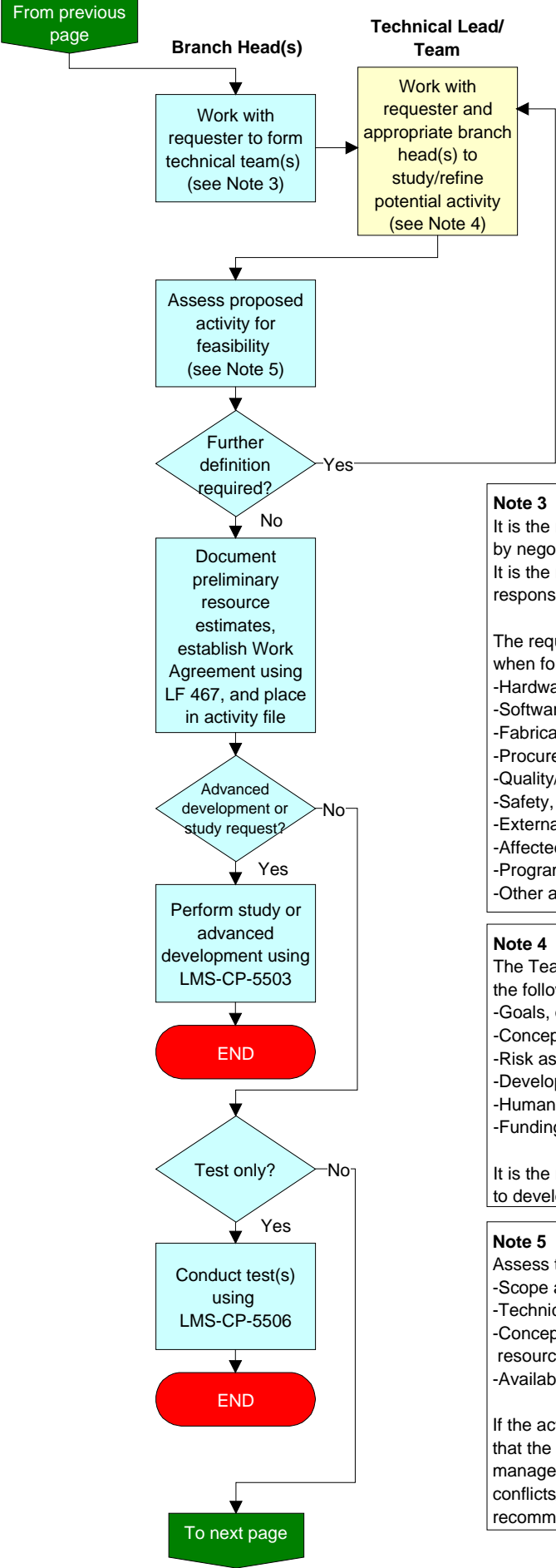
Activities are assessed for:

- Alignment with organizational unit purpose and branch function
- Scope of the effort and funding source
- Concept and technical approach
- Development approach versus financial and human resource estimates
- Availability of resources

If the activity is deemed not viable, the requester must be advised that the activity cannot proceed as requested. If issues cannot be resolved, the activity must be recommended for termination and the decision documented.

The type of documents retained in activity files are affected by the formality and scope of the work being performed. It is competency management's responsibility to ensure that documentation is suitable. The following are examples of documents to be placed in activity files:

- Forms
- Copy daily planner notes
- Presentation packages
- E-mail
- Meeting notes/minutes
- Working copy of proposal



Note 3

It is the responsibility of the requester to form proposal or project teams by negotiating with implementing organizational units. It is the responsibility of competency managers to negotiate roles and responsibilities across branches.

The requester must consider representation from the following areas when forming proposal or project teams:

- Hardware engineering
- Software engineering
- Fabrication
- Procurement
- Quality/mission assurance
- Safety, security, and environment
- External partners
- Affected platforms, vehicles, or facilities
- Program/project office
- Other agencies, governments, regulatory, or private sector bodies

Note 4

The Team(s) is responsible for working with the requester to generate the following:

- Goals, objectives, and constraints
- Concepts and related requirements
- Risk assessment and mitigation plan
- Development approach/plan
- Human, physical, and fiscal resource estimates
- Funding source/sponsor

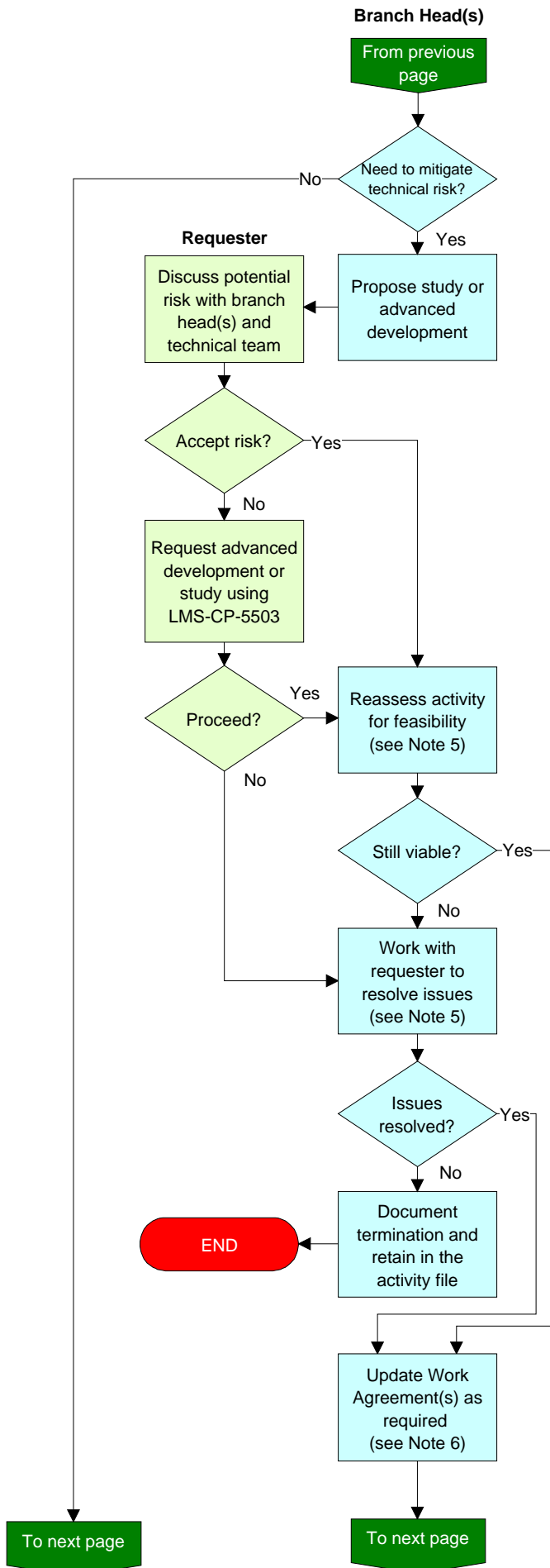
It is the responsibility of the Branch Head(s) to work with the team(s) to develop and approve resource estimates for their functional areas.

Note 5

Assess the activity for:

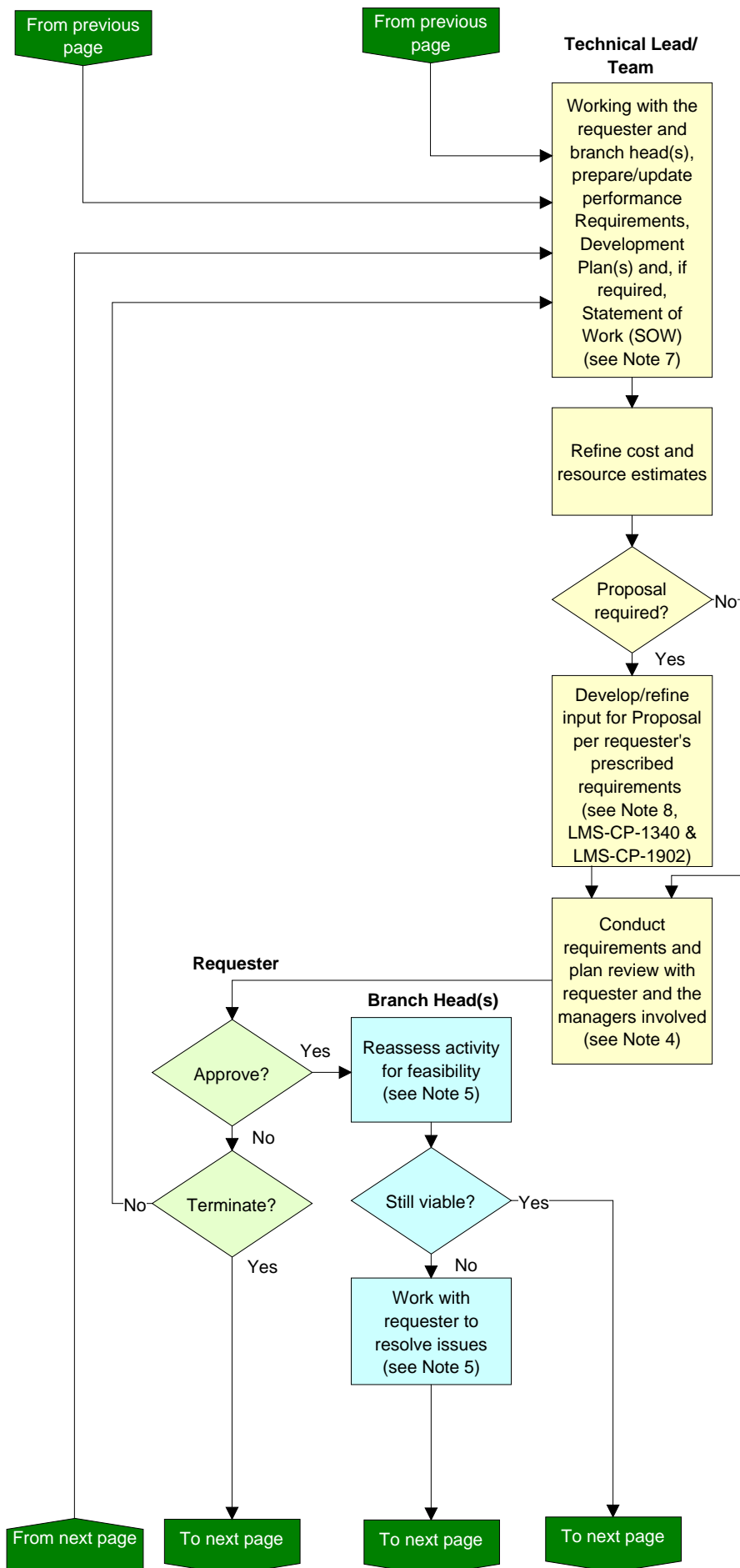
- Scope and complexity of effort
- Technical approach and risk management
- Concept and development approach versus financial and human resource estimates
- Availability of funding and resources

If the activity is deemed not viable, the requester must be advised that the activity cannot proceed. It is the responsibility of competency managers to assist in reestablishing priorities and resolve any conflicts/issues. If issues cannot be resolved, the activity must be recommended for termination.



Note 6

When the cumulative FTE branch commitment growth exceeds 25% of existing Work Agreement, the Work Agreement must be amended to record new resource requirements.



Note 7

The preliminary requirements, SOW, and Development Plan(s) are produced as a joint effort between the technical team, requester, and other proposal/project personnel.

Requirements must include:

- Goals/objectives
- Concept definitions
- Success criteria
- Performance requirements and constraints, to include end item use and interfaces

Preliminary Development Plan(s) must include:

- Major deliverables, both end item and support/test equipment
- System architecture, to include hardware/software partitioning (see LMS-CP-5528)
- Work breakdown structure, to include named responsibilities
- Schedule, to include major milestones and planned reviews
- Make/buy (procurement) plan
- Product assurance and configuration management requirements for deliverables and test equipment (see LAPG 5300.1 and LMS-CP-4750 for space flight systems)
- Risk assessment and mitigation plan(s)
- Facility utilization plan(s)
- Verification/validation method(s), to include planned analysis/simulation, breadboarding, or engineering model or prototype development and preliminary test plan(s)

Note 8

The format of the proposal can be determined by the requester. The following formats may be used:

- Presentation packages
- Formal proposal package, for example, response to Announcement of Opportunity (AO), Requests for Proposal (RFP), Work Package, Space Act Agreement (SAA), Cooperative Agreement Notice (CAN), or NASA Research Announcement (NRA)
- Task Agreement (TA)
- Memorandum of Agreement (MOA)

An approved Proposal is part of the requirements definition and must be used for initial design input. Changes must be controlled via configuration management requirements established for the project/activity.

